

DOI: 10.52363/passa-2024.1-8

UDC: 351:824.11

Kyselov I. - graduate student, V.I. Vernadsky Taurida National University, Kyiv

ORCID: 0009-0003-1848-0866

MECHANISMS OF PUBLIC ADMINISTRATION OF THE DEVELOPMENT OF THE FUEL AND ENERGY COMPLEX FROM THE POSITION OF ENERGY SECURITY ENSURING

The author gives propositions on the development the mechanisms of public administration of the development of the fuel and energy complex from the position of energy security ensuring. The author notes that according to APERC experts, energy security indicators (diversification of energy sources, net dependence on energy imports, range of non-carbon fuel sources, net dependence on oil) make it possible to fully determine the level of energy security of the economy of a particular country. At the same time, At the energy security contains three following basic elements: physical support, economic energy security and environmental sustainability. The author shows that the most frequently quantified aspects are presented in the Model of Short-term Energy Security (MOSES), which aim to assess the performance of a country's energy system by measuring individual indicators. Other indices include the oil vulnerability index and the nonparametric assessment of ecological diversity.

Keywords: *public administration, mechanisms, energy security, the Model of Short-term Energy Security, energy sources.*

Formulation of the problem. In improving public welfare, energy security is currently gaining special importance, ensuring which is one of the main priorities of almost all sovereign states of the world. As a result, energy security follows in its development in the wake of the transformation and development of the world economy and the political structure of individual countries. Since this type of transformation occurs

at different rates and takes on different forms in different regions of the world, the definition, interpretation and scope of the concept of energy security also vary significantly.

The growing importance of energy security has actualized the conduct of relevant theoretical research and the search for the universal content of this term. The transformation and development of the world economy determined the scope and understanding of the term “energy security”. Many researchers give their interpretations of energy security in order to reveal the essence of this term. It is important to consider that energy security has many dimensions and there is still no single comprehensive definition that includes all the priority aspects and attributes for all regions of the world, especially in less industrialized developing countries. All of the above emphasizes the relevance of the chosen research topic.

Analysis of recent research and publications. The paper (Strojny J., Krakowiak-Bal A., Knaga J. & Kacorzyk P., 2023) aims to comprehensively review of the concept of energy security in the context of emerging trends in the energy sector based on a narrative review of the scientific literature. The authors identified the main differences in the perception of energy security, and noted that the "concept of energy supply" of energy security gives way to an approach in which energy is a factor that initiates deep transformations of social systems by changing consumption patterns, reducing energy consumption and forcing changes in economic systems by introducing energy efficiency standards and environmental standards.

The paper (Pokhodenko B., 2023) is devoted to the study and comparison of approaches to ensuring of energy security in the European Union and Ukraine. The article analyzes the main aspects of energy security, such as ensuring of energy independence, stability and sustainability of energy supplies, developing energy efficiency and the use of renewable energy sources, integration into a single energy space, as well as the challenges faced by both sides. The article highlights similarities and differences in approaches to ensuring of energy security in Ukraine and the EU. Among the general aspects, the authors highlight the recognition of the importance of energy security and the significant attention paid to it by both parties.

The paper (Gitelman L., Magaril E. & Kozhevnikov M., 2023) presents conceptual features of energy security management in a radically changed context of growing crisis phenomena and threats of various nature. The authors substantiate the claim that energy security is a complex category expressing the ability of the region's fuel and energy complex to supply the necessary amount and range of energy resources to the domestic market at stable and reasonable prices; promptly mitigate unforeseen fluctuations in demand for fuel and energy resources and provide uninterrupted power supply in real time. The authors analyzed the impact of structural shifts in the electricity industry on the cost of electricity. The authors proposed a set of measures to neutralize negative scenarios in the field of energy security, which appeared due to geopolitical factors, structural changes in the economy, as well as high volatility in energy prices.

Despite the large number of developments presented by scientists and practitioners in the field of energy security, the formation of appropriate public administration mechanisms still remains especially relevant.

Accordingly, the purpose of the work is to develop the mechanisms of public administration of the development of the fuel and energy complex from the position of energy security ensuring.

Presenting main material. One of the most common modern definitions of energy security is the “four A” concept proposed by the Asia Pacific Energy Research Center (APERC). According to the Center's experts, energy security is understood as the ability of the economy to guarantee the availability of reliable and timely supplies of energy resources at prices at a level that will not have a negative impact on the efficiency of the country's economy. In accordance with the “four A” concept, energy security can be achieved by ensuring the following factors.

1. Availability of energy resources.
2. Access to energy resources (accessibility).
3. Availability of energy resources (affordability).
4. Acceptability of energy resources [2; 14].

According to APERC experts, energy security indicators (diversification of energy sources, net dependence on energy imports, range of non-carbon fuel sources, net

dependence on oil) make it possible to fully determine the level of energy security of the economy of a particular country.

At the same time, energy security contains three following basic elements.

1. Physical support.
2. Economic energy security.
3. Environmental sustainability [3; 10].

However, this approach does not take into account the social aspect of energy security. In developing countries, the issue of access to energy is still unresolved and is extremely acute. Energy supplies, in particular electricity, are subsidized to combat poverty and solve other social problems. This serves as an obstacle to socio-economic development, which is an important goal of energy security. In addition, the promotion of behavioral and social changes in line with the trend towards increasing energy efficiency can seriously reduce the volume of demand and, accordingly, the required volume of energy supply.

The “four A's” approach also assumes that the various primary energy sources are interchangeable, when in reality each individual source has its own vulnerabilities that must be considered individually. Among other things, this approach does not include the reliability of the energy services system as a whole, including both the reliability of supply and the control of risks associated with the functioning of components of vital systems, such as transport, infrastructure, warehousing, etc. Only the reliability of primary energy sources is taken into account [7; 12].

Vital energy systems include energy resources, infrastructure and applications in their interconnection, supported by energy flows that fuel important social functions. They may be separated by industry or geographic boundaries. Vulnerabilities are different combinations of risk factors and capabilities to counter them.

However, this definition is based on the assumption that the assets or vital energy systems already exist. In some countries of the world, the security threat lies precisely in the lack of energy resources, infrastructure and/or funds, and not in risks that pose a potential threat. In other words, you cannot secure what does not exist.

Further study of scientific research, analysis of various interdisciplinary sources

and study of the possible integration of factors that make up the concept of energy security, allows us to identify the presence of three main positions when considering energy security: sovereignty, reliability and ability to adapt (adaptability). All three points of view are determined by the characteristics of the disciplines within which they originated [4; 5].

The first point of view, sovereignty, allows you to analyze risks taking into account interests, alliances and the balance of power. Risks are considered in this case as possible targeted influences from abroad [2; 8].

The second point of view in the analysis relies more on natural and technological factors rather than on actions in international politics. It focuses on issues such as deteriorating infrastructure, resource scarcity, and the vulnerability of energy systems to natural disasters such as hurricanes. This view is based on natural sciences and engineering [4; 9].

The third point of view – adaptability – is the result of an analysis of the sources of risk associated with the increasing complexity and ambiguity of technologies, social and economic factors affecting energy security. Building adaptable energy systems that allow them to independently cope with various failures makes more sense in comparison with systems protected only from physical impact [3; 11].

Another perspective – the “strategic” one – allows for greater attention to be paid to planning and risks in the absence of adequate policies and strategies regarding monitoring, general risk management mechanisms, regulatory procedures and power system design. This perspective considers the synchronization of preferences and decisions with the overall efficiency of the energy sector, economic development, and national priorities, which may include issues such as reducing hydrocarbon emissions, subsidizing energy services, strong public sector participation, and monopolization of energy and utility systems. This point of view can also combine all standard approaches to defining energy security, and is based on strategic management. The strategy provides for the effective and successful implementation of the political initiative [10; 13].

Undoubtedly, the content of energy security takes different forms in different countries and regions due to a number of factors, such as the level of economic

development, the availability of natural resources and the priorities inherent in a particular country. For countries producing electricity, a critical aspect is stable growth in demand to ensure the availability of a market for energy resources in the long term. In developed countries, the availability of uninterrupted supplies of energy resources is of great importance for fueling the economy and maintaining a high standard of living. For developing countries, the main challenge is to ensure the availability of a reliable source of energy resources needed both to support economic development and to provide all citizens with access to modern energy services.

Energy security in developing countries is a key element in poverty reduction. With some economies more susceptible to the negative impacts of energy price volatility, such as skyrocketing oil prices, the challenge of ensuring stability and predictability has become increasingly important globally [1; 4].

The liberalization of the energy market in many countries resulted from criticism of government control and the fact that strict regulation was at the core of the economic downturn that occurred after the energy crisis of the 1970s. Increased competition and reduced government intervention gradually led to the disintegration of vertically integrated state monopolies and the formation of new pricing and trading mechanisms. In many countries of the world, with the exception of a few countries with developing or transition economies, this trend has prevailed.

Market-oriented definitions of energy security are based on the fact that this concept is built on the reliability of supplies and their adequacy to demand.

The general idea is that by liberalizing the energy market, it itself creates the conditions for energy security, and that the only determination of energy security can be market-based, supply- and price-based. Therefore, energy security policies must ensure the proper functioning of the energy market. Competitive markets and independent regulation are considered as the most effective way to ensure a safe and reliable supply of energy. This approach is practiced in many Western European countries, including the UK [2; 6].

Accordingly, it is necessary to focus on broader definitions of energy security, reflecting all its key aspects, and not just on the balance of supply and demand and price

formation, since there are problems of a different kind that may be relevant and gain significance in different regions of the world, taking into account specific circumstances.

Another approach to determining energy security involves determining deviations of the current state of affairs in the field of energy security from the desired situation by performing quantitative measurements. This approach evaluates the risks and effectiveness of policies using quantitative indicators to understand how a particular development will affect the situation. The most frequently quantified aspects are presented in the Model of Short-term Energy Security (MOSES), which aim to assess the performance of a country's energy system by measuring individual indicators. Other indices include the oil vulnerability index and the nonparametric assessment of ecological diversity [4; 10].

The replacement of coal with oil as the main source of energy has led to the perception that energy security lies in the need to protect import systems. As the number of industrialized countries around the world increases, the element of having an uninterrupted supply of energy through domestic production or import has become firmly established in the concept of energy security. Stimulating competition in the energy market has led to the emergence of the concept of energy security as a phenomenon determined by price, which is described using terms such as reasonable, affordable, moderate, economically determined or cost-effective.

Moreover, over the past two decades, many developing regions of the world have experienced high rates of economic growth, leading to increased energy demand and further rapid growth in global demand. Since most of these countries are middle-income or lower economies, the uneven distribution of modern energy services is becoming a growing concern. Access to energy today is becoming a serious factor in energy security in almost half the countries of the world. The development of renewable energy sources and climate change issues contribute to the formation of the view that the presence of sufficient volumes of fossil fuels does not guarantee energy security in itself, since it harms the very ecosystem in which we live, and as a result, many modern definitions of energy security include elements such as acceptability or environmental friendliness [7;

11].

Conclusions. Thus, determining the degree of exposure to various factors is a task for each country, which must be addressed as often as the task of revising economic indicators. Factors that weaken the power system are represented by a balance between the risks present and the system's ability to withstand them. Such factors may include groups of economic, political, natural, technical and social potential risks that could cause disruptions in the operation of energy systems. Quantitative assessment of energy security and the effectiveness of measures aimed at improving the efficiency and performance of the industry should also be carried out on an annual basis in each state in order to determine the current level and evaluate performance indicators to solve the problem of ensuring full control over the level of energy security. As the economy develops and national priorities are realized, the importance of energy security also grows. Thus, in addition to the terminological definition of energy security, it is important to study its aspects, indicators, approaches and prospects that influence the essence of energy security and the mechanisms of its increasing.

References:

1. Dandeker C. (1994). "New times for the military: Some sociological remarks on the changing role and structure of the armed forces of the advanced societies", *The British Journal of Sociology*, 45:4, pp. 637–54
2. Garrison D. R. (2007). "Online community of inquiry review: social, cognitive, and teaching presence issues", *J. Asynchron. Learn. Netw*, 11, pp. 61–68
3. Gitelman L., Magaril E. & Kozhevnikov M. (2023). "Energy security: new threats and solutions", *Energies*, 16, pp. 2869.
4. Horbyk R. (2002). "The war phone": mobile communication on the frontline in Eastern Ukraine", *Digi War* 3, pp. 9–24.
5. Koyama K. & Kutani I. (2012). "Developing an energy security index. In study on the development of an energy security index and an assessment of energy

security for East Asian countries”; Soontornchai, S., Ed.; Economic Research Institute for ASEAN and East Asia (ERIA): Jakarta, Indonesia, 2012; pp. 7–47.

6. Pokhodenko B. (2023). “Review and comparative analysis of energy security concepts of the European Union and Ukraine”, The Journal of V. N. Karazin Kharkiv National University. Series: International Relations. Economics. Country Studies. Tourism, (17), pp. 56-79.

7. Paul A. Kirschner, John Sweller, & Richard E. Clark (2007). “Why Minimally Guided Teaching Techniques Do Not Work: A Reply to Commentaries,” Educational Psychologist 42(2), pp. 115-121.

8. Mara D., Nate S., Stavvytskyy A. & Kharlamova G. (2022). “The place of energy security in the national security framework: an assessment approach”, *Energies*, 15, pp. 658.

9. Martin A. (2008). “Digital literacy and the “digital society”, *Digital Literacies Concepts Policies Practices*, 30, pp. 151–176.

10. Martsenyuk T. (2014). “Gender and Revolution in Ukraine: Women’s Participation in Euromaidan Protests of 2013–2014”, *Perspectives on Europe*, 44(2), pp. 15–22.

11. Naess-Schmidt S., Hansen, M.B. & von Below D. (2015). “Literature Review on Macroeconomic Effects of Energy Efficiency Improvement Actions”, COMBI: Copenhagen, Denmark.

12. Strojny J., Krakowiak-Bal A., Knaga J. & Kacorzyk P. (2023). “Energy security: a conceptual overview”, *Energies* 16, pp. 5042.

13. Trantopoulos K., von Krogh G., Wallin M. W. & Woerter M. (2017). “External knowledge and information technology: Implications for process innovation performance”, *MIS Quarterly*, 41(1), pp. 287–300.

14. Westerman G. & Bonnet D. (2015). “Revamping your business through digital transformation”, *MIT Sloan Management Review*, 56(3), pp. 2–5.

Received: 09.04.2024

Accepted: 19.05.2024

Published: 27.06.2024